

REPORT
OF THE
CANADIAN ARCTIC EXPEDITION
1913-18

VOLUME IV: BOTANY

PART C: FUNGI

By JOHN DEARNESS



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OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1923

Issued June 1, 1923

Report of the Canadian Arctic Expedition, 1913-18.

VOLUME I: GENERAL INTRODUCTION, NARRATIVE, ETC.

- Part A: NORTHERN PARTY, 1913-18. By Vilhjalmur Stefansson. (In preparation)
 Part B: SOUTHERN PARTY, 1913-16. By Rudolph Martin Anderson. (In preparation)

VOLUME II: MAMMALS AND BIRDS

- Part A: MAMMALS OF WESTERN ARCTIC AMERICA.
 By Rudolph Martin Anderson. (In preparation).
 Part B: BIRDS OF WESTERN ARCTIC AMERICA.
 By R. M. Anderson and P. A. Taverner. (In preparation)

VOLUME III: INSECTS

- INTRODUCTION. By C. Gordon Hewitt. (Issued December 10, 1920).
 Part A: COLLEMBOLA. By Justus W. Folsom. (Issued July 10, 1919).
 Part B: NEUROPTEROID INSECTS. By Nathan Banks. (Issued July 11, 1919).
 Part C: DIPTERA.
 Crane-flies. By Charles P. Alexander.
 Mosquitoes. By Harrison G. Dyar.
 Diptera (excluding Tipulidae and Calicidae). By J. R. Malloch. (Issued July 14, 1919).
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 Mallophaga. By A. W. Baker.
 Anoplura. By G. F. Ferris and G. H. F. Nuttall. (Issued September 19, 1919).
 Part E: COLEOPTERA.
 Forest Insects, including Ipidæ, Cerambycidae, and Buprestidæ. By J. M. Swaine.
 Carabidæ and Silphidæ. By H. C. Fall.
 Coccinellidæ, Elateridæ, Chrysomelidæ and Rhynchophora (excluding Ipidæ).
 By C. W. Leng.
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 Part G: HYMENOPTERA AND PLANT GALLS.
 Sawflies. (Tenthredinoidea). By Alex. D. MacGillivray.
 Parasitic Hymenoptera. By Charles T. Brues.
 Wasps and Bees. By F. W. L. Sladen.
 Plant Galls. By E. Porter Felt. (Issued November 3, 1919).
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 Spiders. By J. H. Emerton.
 Mites. By Nathan Banks.
 Myriapods. By Ralph V. Chamberlin. (Issued July 14, 1919).
 Part I: LEPIDOPTERA. By Arthur Gibson. (Issued January 10, 1920).
 Part J: ORTHOPTERA. By E. M. Walker. (Issued September 4, 1920).
 Part K: INSECT LIFE ON THE WESTERN ARCTIC COAST OF AMERICA.
 By Frits Johansen. (Issued November 7, 1921).
 Part L: GENERAL INDEX. (Issued December 1, 1921).

VOLUME IV: BOTANY

- Part A: FRESHWATER ALGAE AND FRESHWATER DIATOMS. By Charles W. Lowe. (Issued February 20, 1921).
 Part B: MARINE ALGAE. By F. S. Collins. (In preparation).
 Part C: FUNGI. By John Dearness. (In preparation).
 Part D: LICHENS. By G. K. Merrill. (In preparation).
 Part E: MOSSES. By R. S. Williams. (Issued February 8, 1921).
 Part F: MARINE DIATOMS. By Albert Mann. (In preparation).

VOLUME V: BOTANY

- Part A: VASCULAR PLANTS. By James M. Macoun and Theo. Holm. (Issued October 11, 1921).
 Part B: CONTRIBUTIONS TO MORPHOLOGY, SYNONYMY AND GEOGRAPHICAL DISTRIBUTION OF ARCTIC PLANTS. By Theo. Holm. (Issued February 10, 1922).
 Part C: GENERAL NOTES ON ARCTIC VEGETATION. By Frits Johansen. (In preparation)

VOLUME VI: FISHES, TUNICATES, ETC.

- Part A: FISHES. By F. Johansen. (In preparation).
 Part B: ASCIDIANS, ETC. By A. G. Huntsman. (Issued November 29, 1922).

VOLUME VII: CRUSTACEA

- Part A: DECAPOD CRUSTACEANS. By Mary J. Rathbun. (Issued August 18, 1919).
 Part B: SCHIZOPOD CRUSTACEANS. By Waldo L. Schmitt. (Issued September 22, 1919).
 Part C: CUMACEA. By W. T. Calman. (Issued October 15, 1920).
 Part D: ISOPODA. By P. L. Boone. (Issued November 10, 1920).
 Part E: AMPHIPODA. By Clarence R. Shoemaker. (Issued September 7, 1920).
 Part F: PYCNOGONIDA. Leon J. Cole. (Issued January 3, 1921).
 Part G: PHYLLOPODA. By F. Johansen. (Issued May 10, 1922).
 Part H: CLADOCERA. By Chancey Juday. (Issued June 23, 1920).
 Part I: OSTRACODA. By R. W. Sharpe. (In preparation).
 Part J: FRESHWATER COPEPODA. By C. Dwight Marsh. (Issued April 21, 1920).
 Part K: MARINE COPEPODA. By A. Willey. (Issued June 25, 1920).
 Part L: PARASITIC COPEPODA. By Charles B. Wilson. (Issued August 6, 1920).
 Part M: CIRRIPEdia. By H. A. Pilsbry. (In preparation).
 Part N: THE CRUSTACEAN LIFE OF SOME ARCTIC LAGOONS, LAKES AND PONDS.
 By F. Johansen. (Issued December 30, 1922).

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INTRODUCTION

At the request of the late Mr. James M. Macoun, I undertook the study of the fungi collected by the naturalists of the Southern Party of the Canadian Arctic expedition. Mr. Frits Johansen had collected about thirty species, storing the fleshy ones in alcohol and preserving the others dry.

In addition to the examination of these I have been afforded the opportunity to examine the collections of phanerogams for fungi that might be found inhabiting them. This experience was interesting in several ways. I was surprised at the relatively small number of "summer stages" of parasitic fungi. On an equal number of affected flowering plants collected in the southern latitudes of Canada there would be a large majority of examples of the stage of fungi reproducing by conidia or "summer spores" of some kind. Most of the fungi inhabiting the arctic plants were found only in the ascigerous or mature condition.

Another unexpected difference appeared in the wider range of host plants inhabited by the same fungus species. In the south, as a rule, one fungus at a time inhabits one host plant; in the north, it was not uncommon to find two or three micromycetes on the same individual host plant, especially on those plants that grow in dense rosettes or in the pillar form. On the latter the leaves, though winter-killed or dead, remain firmly attached to the plant for years and doubtless afford it protection. Fungi thus have the opportunity to become established on a plant in successive years. Parasitism does not seem to play much part. There, as here, the mature stage of the fungus seems to be quite saprophytic or, at worst, invading the tissue only when its vitality languishes. At Mr. Macoun's suggestion I have made notes of the findings in the important orders of the fungi listed in the available reports of the flora of American arctic regions, other than the one explored by the Canadian expedition. For that purpose the following reports were used:¹

Meddelelser om Groenland, Bind III, Copenhagen, 1880, containing Oversigt ov Svampe by E. Rostrup, 1888, and Tillaeg, 1891, by the same author.

Meddelelser om Groenland, Bind XVIII, Copenhagen, 1896, containing Oest Groenlands Svampe by E. Rostrup, 1894, and Champignons du Groenland Oriental.

Meddelelser om Groenland, Bind XXX, Copenhagen, 1907-1911, containing Fungi Groenlandiae Orientalis in Expeditionibus 1898-1902. Determ. E. Rostrup, 1904.

Meddelelser om Groenland, Bind XLIII, Copenhagen, 1911-1917, containing Fungi Terrestres north of 76° N. Lat. Determ. C. Ferdinandsen, and Systematic List of Micromycetes, Determ. J. Lind. (The specimens were collected 1906-1908).

The Nares Expedition on the *Alert* and *Discovery*, 1875-76, containing enumeration of the Fungi by Rev. M. J. Berkeley, published in the Journal of the Linnean Society, 1878.

Harriman Alaska Expedition, 1899, Vol. V, containing Cryptogamic Botany of Alaska, by William Trelease, New York, 1904.

¹ In the Report of the International Polar Expedition to Point Barrow, Alaska, Washington, 1885, p. 192, Prof. ASA Gray, in a brief report on the Plants, states: "There was a quantity of fungi preserved in a jar of alcohol, but without notes of color, habit, etc., so that the specific determination is in their present state impossible. The specimens, as far as could be told, seemed to include two species of *Agaricus* and one of *Russula*."

Second Norwegian Arctic Expedition in the *Fram* 1898-1902, Vol. 2, Kristiania, 1906, containing Fungi collected by H. G. Simmons and determined by E. Rostrup.

Duc d'Orleans, Croisière Océanographique accomplie à bord de la *Belgica* dans la mer du Grönland 1905. Bruxelles, 1907.

Some Alaskan and Yukon Rusts, *The Plant World*, Vol. 14, 233, 1911, by J. C. Arthur.

So far as I know these are the only reports upon collections of American arctic fungi. There have been other collections of phanerogamous plants but usually if the collectors of such plants are not looking for fungi they remove discoloured and deformed parts when they do not or cannot select clean, healthy-looking specimens.

Anyone who has observed the greatly varied and abundant fungus flora of rich woods in southern Canada and contrasted it with the scanty and poorly developed flora in an exposed and comparatively arid region is prepared to believe that within the Arctic circle the fungi will be very meagerly represented.

In the report on the cryptogamic botany of Alaska published for the Harriman Alaska Expedition in 1903-04, the editor, Dr. William Trelease, notes that up to that time only 14 species of fungi had been listed.¹ Commenting thereupon, he says: "The fact remains that almost nothing is known of the fungus flora of Alaska and yet conditions are favourable for a development there of a large representation of this group of plants." He referred to the rainfall and fogs and mists common on the long coastal region favouring as they do a large and varied phanerogamic vegetation. Besides, the lower coast of Alaska from Sitka and Yakutat to Kadiak, where much of the Harriman expedition's collecting was done, is nearly 500 miles south of the Arctic circle. That so few Alaskan fungi had been enumerated prior to 1900 is the more surprising in view of the fact that at the same date no less than 386 Alaskan species and varieties of their congeners—the lichens—had been listed.²

Greenland's long coast-line both on the east and west sides has been explored at many points by scientists connected with several Danish and other expeditions; and while, doubtless, there will yet be important additions made, its fungus flora is much more completely studied than that of any other extensive region of arctic America. In making comparisons it must be borne in mind, however, that its southern point is more than 450 miles south of the Arctic circle.

TABLE SHOWING DISTRIBUTION OF ARCTIC FUNGI

	Alaska	Arctic Canada	Greenland
Myxomycetes.....	7	0	6
Phycomycetes.....	7	0	7
Pyrenomycetes.....	56	50	195
Discomycetes.....	26	11	113
Uredineae.....	46	9	27
Ustilagineae.....	4	3	12
Hymenomycetes.....	56	35 ³	105
Gasteromycetes.....	4	4	15
Fungi Imperfecti, including			
Sphaeropsides.....			
Mucedines.....			
Melanconiae et al.....	43	26	172
Other Orders.....	4	4	16

¹Trelease, William, in the Harriman Alaska Expedition, Vol. V, 13.

²Cummings, Clara E., in Harriman Alaska Expedition, Vol. V, 69.

³The unidentified species are included.

The collections enumerated in this report were made between lat. 67° N. and lat 77° N., chiefly along the northern coast-line of the Yukon and Mackenzie districts; the positions of most of the localities are stated in the introduction to Part A of Vol. V. The median line of the chief collecting points runs from near Point Barrow to Bathurst inlet, a distance, following the coast, of over 1,200 miles and averaging about 150 miles north of the Arctic circle. The collections made in the territory near the mouth of the Sadlerochit river and in the northeast corner of Alaska are not separated in the above table from the strictly Canadian ones.

The time and locality of collection of the plants herein listed are given as exactly as the available data permitted, and, further to identify the particular plant on which the micromycete was observed, the number of the plant as preserved in the National Herbarium, Victoria Memorial Museum, Ottawa, is added. Thus under *Pleospora arctica*, 98416 is the herbarium number of the particular specimen of *Oxytropis campestris* var. *sordida* upon which this fungus was studied.

Mr. Frits Johansen was the collector in all instances where no other name is given.

JOHN DEARNESS.

LONDON, ONTARIO, November 27, 1922.

The Fungi of the Arctic Coast of America West of the 100th Meridian

Collected by the Canadian Arctic Expedition 1913-18

By JOHN DEARNESS, M.A.

MYXOMYCETES.

No Myxomycetes were collected by the Canadian Arctic expedition. One species was found by the Harriman Alaska expedition. In the consulted reports of the Greenland expeditions six myxomycetes are listed.

PHYCOMYCETES.

The Phycomycetes, including the Mucors, Peronosporae, and about a dozen other less important families, must be rare in the arctic regions, for only five species are named in the Alaska report, and seven species in the Greenland lists. None were collected by the Canadian Arctic expedition.

ASCOMYCETES.

SORDARIACEAE.

No species of this interesting family were brought back. They are small plants, nearly all of them growing in the ordure of animals. It is extremely probable that several of them are existent in the territory. In the Amstrup expedition to northeast Greenland, between 69° and 74.30° N. lat., N. Hartz found no less than nine different species growing in the droppings of animals, four of them in Sordariaceae and three in Ascoboleae.

SPHAERIACEAE.

Gnomonia sp.

On leaves of *Salix Richardsonii* Hook. Camden bay, Sept. 1913, 93802.

Beak 400-500 μ long, slightly enlarged at ostiole. Too old or too imperfectly developed to determine the species.

Mycosphaerella confinis (Karst.)

Sphaerella confinis Karst. Myc. Fenn. II, p. 179.

On leaves of *Anemone parviflora* Michx. Bernard harbour, July 4, 1915, 97828.

Mycosphaerella eriophila (Niessl)

Sphaerella eriophila Niessl. Neue Kernp. p. 86.

On *Erigeron compositus* Pursh. Bernard harbour, July 10, 1915, 98960.

This species was found on the same host in Greenland. It is reported on *Artemisia* in western Alaska. Doubtless it is a common arctic species.

Mycosphaerella immersa n. sp.

Peritheciis immersis, ostioliis erumpentibus, 270 μ in diam. Asci 75 x 9-10 μ , paraphysatis. Sporidiis uniseriatis, hyalinis, ellipticis, uniseptatis, non constrictis, 15 x 8 μ .

In foliis *Cassiopis tetragonae* (L.) Don.

Perithecia deeply immersed in the leaves, only the ostiola erumpent, 270 μ in diameter. Asci 75 x 9-10 μ , paraphysate. Sporidia not constricted, uniseriate, hyaline, elliptic, uniformly 15 x 8 μ .

On leaves of *Cassiope tetragona* (L.) Don. Camden bay, July 2, 1914, 98763.

***Mycosphaerella inconspicua* (Schroet.)**

Sphaerella inconspicua Schroet. Nord. Pilze, p. 12.

On leaves and flower stems of *Cassiope tetragona* (L.) Don. Bernard harbour, August, 1915, 98762.

The species is common on this host.

***Mycosphaerella minor* (Karst.)**

Sphaerella minor Karst. Myc. Fenn. 11, 171.

On leaves of *Dodecatheon frigidum* Cham. and Schlecht. Shingle point, Mackenzie river delta, August 4, 1914, J. R. Cox and J. J. O'Neill, 98824.

Gregarious, connected at base by radiating hyphae. Asci 30-33 μ ; sporidia 9-12 x 3 μ .

A form of this species on *Saxifraga*, having larger fruit—asci about 50 x 15 μ and sporidia 15-18 x 5 μ —and a brown subiculum visibly colouring the affected areas of the leaf and connecting the species with *Sphaerella trichophila* Karst., was described in Mycologia IX, 346. The distinction between the two species seems to hinge on the bristly appendages and the size of the fruit. On the collections in hand considerable difference in these features are found on the same host plant, making it difficult to determine to which species the fungus should be referred.

On *Saxifraga Nelsoniana* D. Don. Camden bay, June 7, 1914.

***Mycosphaerella minor* (Karst.) var. *reticulata* n. var.**

Peritheciis 75-140 μ ad subiculum. Ascis 50-65 x 10-15 μ . Sporidiis 15-16 x 4-5 μ .

In foliis mortuis *Salicis reticulatae* L.

The radiating, brown, septate, branching fibers bearing the gregarious perithecia are innate and raise the cuticle on the lower side of the leaf into areas of ashen colour 2-4 mm. in diameter. These areas are quite opaque when held against the light. Some of the perithecia are bristly, suggesting the characters of *Venturia*. These were described in 1917 and published in Mycologia IX: 347 under the name of *Venturia subcutanea*. Subsequent examination of additional material showed forms approaching Karsten's *Sphaerella minor* in habit and structure but with larger perithecia, asci and sporidia. The smoother and smaller perithecia are much like those of *Mycosphaerella minor* but the fructification is generally larger and the subiculum denser. The largest and most bristly perithecia might be taken for *Mycosphaerella trichophila* (Karst.) which is also innate and subiculate. It is intermediate between them but all things considered it seems nearer to *M. minor* and in the meantime is disposed of as a variety of that species. Further study of sufficient material may yet show it to be a distinct species.

On leaves of *Salix reticulata* L. Camden bay, June 29, 1914.

***Mycosphaerella prope oothecam* (Sacc.)**

Sphaerella ootheca Sacc.

On leaves and peduncles of *Ranunculus affinis* R. Br. Bernard harbour, July 12, 1915, 97920.

The asci and sporidia are so variable on this material that the determination of the species is uncertain. A *Rhabdospora* near *Drabae* (Fuckl.) and *Pleospora vulgaris* Niessl were also present on this collection of *Ranunculus affinis*.

Mycosphaerella pachyasca (Rostr.) Vgr.*Sphaerella pachyasca* Rostrup. Sacc. Syll. IX, p. 613.On *Oxyria digyna* (L.) Hill. Bernard harbour, July 6, 1915, 98150.On *Papaver nudicaule* L. Bernard harbour, Aug. 25, 1915, 97855.On *Draba nivalis* Liljebl. Bernard harbour, July 17, 1915, 98657.On *Parrya arctica* R. Br. Bernard harbour, July 10, 1915, 98704.On *Potentilla palustris* (L.) Scop. Herschel island, Aug. 1, 1916, 98738.On *Astragalus alpinus* L. Collinson point, July 17, 1914, 98214.On the type specimen of *Artemisia hyperborea* Rydb. Bernard harbour, Aug. 14, 1915, 89997.On *Artemisia* sp. Victoria island, March 29, 1916.

This species seems to be the commonest pyrenomyceete on dicotyledons in the region.

Mycosphaerella Pedicularis (Karst.)*Sphaerella Pedicularis* Karsten. Fungi Spetsb. No. 53.On *Pedicularis sudetica* Willd. South of Coronation gulf, July 18, 1915, J. R. Cox and J. J. O'Neill, 98913.**Mycosphaerella Tassiana** (de Not.) Johans.*Sphaerella Tassiana* de Not. Sacc. Syll. I, p. 530.On *Trisetum spicatum* (L.) Richter. Wollaston land, Aug., 1915, D. Jenness, 91355.Judging from the Greenland reports and that of the *Fram* expedition, this fungus is the one most commonly found on the grasses of our northeast arctic region.**Physalospora Crepiniana** Sacc. and March.On *Empetrum nigrum* L. Herschel island, July 29, 1916, 98781.Perithecia are hypophyllous. Asci paraphysate, 60-75 μ . Ascospores 18-21 x 8 μ .**Didymosphaeria Johansenii** n. sp.Peritheciis hypophyllis, dispersis, immersis, globosis, circa 100 μ in diam.; ostiolis emergentibus, perforatis. Ascis subglobatis clavatisve, breviter stipitatis, 33-45 x 18-25 μ . Sporidiis sub-biseriatis congregatisve, uniseptatis, hyalinis denique fuliginosis, 12-16 x 4.5-6 μ .In foliis et petiolis *Mertensiae maritima* (L.) S. F. Gray.Perithecia hypophyllous, thickly scattered, immersed, globose, about 100 μ in diameter; ostiola emergent, perforate. Asci sub-globate to clavate, sometimes widest near the short-stipitate base, 33-45 x 18-25 μ . Sporidia biseriate to congregate, uniseptate, hyaline at first, becoming fuliginous, 12-16 x 4.5-6 μ , mostly 15 x 5 μ . When immature this species would be taken for a *Mycosphaerella*.On leaves and petioles of *Mertensia maritima* (L.) S. F. Gray. Spy island, Alaska, Sept. 3, 1913, 98954.

On the same host, but immature, west of Martin point, end of July, 1914, 98959.

Metasphaeria sp. [probably *Empetri* (Fr.) Sacc.]On *Empetrum nigrum* L. Bathurst inlet, Aug. 22, 1915, R. M. Anderson, 98780Asci paraphysate, 60 x 8-11 μ ; sporidia hyaline, 3-septate, 15 x 3-4.5 μ .

Leptosphaeria prope borealem E. and E.

On weathered root of *Salix pulchra* Cham. Bernard harbour, July 12, 1916, 100485.

This collection is too old for certain determination of the species. The features extant correspond with those of *L. borealis*.

Leptosphaeria prope Hierochloa Ouds.

On *Dupontia Fischeri* R. Br. Bernard harbour, Aug., 1915, 91325.

Sporidia 5-septate, third cell larger than the others, the cells mostly about 11 μ in each dimension in the largest spores.

As a rule, the size and form of the asci and sporidia in the Sphaeriaceae are so constant in the same species that the measurements and septation have important diagnostic value. In the same perithecia in this collection these organs show considerable disparity. The largest asci measured were fully twice as large as the smallest ones.

Massarina Dryadis Rostr.

On *Dryas integrifolia* M. Vahl. Bernard harbour, July 5, 1916.

In the dense mass of small revolute leaves three fungi were found, namely *Mycosphaerella pachyasca*, *Pleospora* sp., and a few leaves with a *Massaria*-like species which is probably *Massarina Dryadis* Rostr.

In the original description Rostrup does not give the measurements. The sporidia here were 3-septate, constricted, 30-35 μ long and 15 μ wide in the widest part. Rostrup found his species on dead leaves of *Dryas* from Greenland. Trelase found what he thought might be Rostrup's species on *Dryas integrifolia* collected by Murdoch at Point Barrow, Alaska, upon which he makes the remark "not entirely mature."

The collector's note reads: "A yellow fungus-blight turning the leaves of the common *Dryas* a yellow colour." From the material examined I could not determine which, if any, of the fungi found caused the blighting of the leaves.

Pleospora arctica Fuckl.

On *Oxytropis campestris* (L.) DC. var. *sordida* Willd. Wollaston land, Aug., 1915, D. Jerness, 98416.

On stems of *Epilobium latifolium* L. Bernard harbour, July 30, 1915, 98750.

Pleospora Drabae Schroet. var. *nuda* n. var.

Peritheciis nudis; sporidiis constrictis.

On leaves and stems of *Draba nivalis* Liljebl. Bernard harbour, July 17, 1915, 98657; August 7, 1915, 98662.

Schroeter in Nord. Pilze gives the perithecia as surrounded at the base by creeping hyphae, otherwise smooth. The perithecia on this material are naked but are collapsing and papillate as in Schroeter's description. The sporidia are constricted and primarily 3-septate; when they become 5-septate the three primary cells remain distinct; the larger part of the sporidium is superior to the middle constriction.

Pleospora herbarum (Pers.) Rabh.

Synonymy in Ell. and Evrht. N. Am. Pyr. p. 335.

On *Elymus mollis* Trin. Bernard harbour, Aug. 4, 1915, 91351; Martin point, July, 1914, 91353.

On *Papaver nudicaule* L. Konganevik, June 27, 1914, 97870.

On *Lesquerella arctica* (Rich.) Wats. Bernard harbour, July 4, 1915, 98667.

On *Hesperis Pallasii* (Pursh) T. and G. Bernard harbour, July 7, 1915, 98671.

On *Parrya arctica* Br., mixed with *Mycosphaerella*. Bernard harbour, July 10, 1915, 98704.

On *Potentilla pulchella* R. Br. Collinson point, June 18, 1914, 98820.

On *Oxytropis Roaldi* Ostf. Bernard harbour, Aug. 1, 1915, 98106.

On *Arnica alpina* (L.) Olin. South coast of Coronation gulf, July, 1915.
J. R. Cox and J. J. O'Neill, 97647.

In Meddelelser om Groenland, 43, 155, L. Lind states that what he calls *Pleospora arctica* Fekl. (not *Pleospora arctica* Karst.) is very probably the same fungus that E. Rostrup in Fungi Groenlandiae repeatedly calls *Pleospora herbaram* (Pers.). Rostrup held that there is no difference between the two species. Lind, however, contends that there are differences, and he mentions that the sporidia of *P. arctica* are the smaller and when mature are the darker of the two. Lind would probably call the examples listed above by the latter name. His diagnosis of *P. arctica* is as follows: "Peritheciis 350 x 240 μ ; ascis oblongis curvatis, 100-128 x 23-28 μ ; paraphysibus numerosis, hyalinis, multiguttulatis sporidiis initio flavis, dein saturate brunneis, 34-36 x 14-16 μ , 6-septatis medio constrictis, parte superna parum tumidiore longitudinaliter 1-2-septatis."

***Pleospora vulgaris* Niessl**

On *Lychnis apetala* L. Icey reef, Alaska, Aug. 3, 1914, 98292.

On *Ranunculus affinis* R. Br. Bernard harbour, July 12, 1915, 97920.

On *Papaver nudicaule* L. Bernard harbour, Aug. 25, 1915, 97855. The fructification on this host is rather small for *P. vulgaris* and much smaller than that of *Pleospora papaveraceae* (de Not.).

On *Phaca frigida* L. Victoria island, March 19, 1916.

On *Erigeron compositus* Pursh. Bernard harbour, July 10, 1915, 98960.

On *Artemisia Richardsoniana* Bess. Bernard harbour, Aug. 4, 1915, 89998.

On *Saussurea angustifolia* DC. Herschel island, August, 1914, 98973.

***Pleospora* sp.**

On stems of *Papaver nudicaule* L. Victoria strait, August 22, 1918, Capt. J. F. Bernard.

The perithecia bear radiating brown hyphae at base and have constricted sporidia, upper "half" larger. The species bears a close resemblance to Schroeter's *P. Drabae*.

***Clathrospora Elynae* Rabh.**

Pleospora Elynae Ces. and de Not.

On *Juncus arcticus* Willd. Bernard harbour, August 25, 1915, 97820.

Clathrospora has clathrate, amber-coloured sporidia differing from *Pleospora* in that the cells all lie in one plane. The asci and sporidia in this collection on *Juncus* are smaller than the measurements given by Lind as found by him on *Luzula* collected in Greenland. The sporidia on the Bernard harbour material are very variable in size, reaching a maximum of about 45 x 20 μ . They show about 25 cells on the side and 7 or 8 on the edge.

***Clathrospora pentamera* (Karst.) Berlese**

Pleospora pentamera Karst. Fungi Spetsb. p. 99.

On *Alopecurus alpinus* Sm. Bernard harbour, August 25, 1915, 91337.

The species was first described by Karsten on material found in Spitzbergen. It is reported in Greenland on a half-dozen or more species of grasses and also in western Alaska on *Dupontia*; hence it is probably a widely distributed inhabitant of the arctic grasses.

The sporidia, when viewed on the flat side, are somewhat pear-shaped.

***Clathrospora platyspora* Sacc.**

On *Statice Armeria* L. forma *sibirica* (Turez.) Simm. Cape Bathurst, August 18, 1900, Rev. I. O. Stringer, 62225.

Pyrenophora chrysospora (Niessl) Sacc.*Pleospora chrysospora* Niessl. Hedw. 1880, p. 173.On *Parrya macrocarpa* R. Br. Camden bay, July 17, 1914, 98673.On *Oxytropis campestris* (L.) DC. var. *sordida* Willd. Bernard harbour, August 1915, 98415.On *Oxytropis nigrescens* (Pall.) Fisch. Camden bay, July 17, 1915, 98413.On *Campanula uniflora* L. Bernard harbour, Aug. 16, 1915, 98779.

This fine species is reported from East and West Greenland and from Alaska.

Pyrenophora comata (Awd. and Niessl) Sacc.*Pleospora comata* Awd. and Niessl. Transl. in Ell. and Evrht. N. Am. Pyr., p. 349.On *Oxyria digyna* (L.) Hill. Cape Bathurst, July, 1916, 98149.On leaves of *Dodecatheon frigidum* Cham. and Schlecht. Herschel island, August, 1914, 99825.**Pyrenophora paucitricha** (Fuckl.) Berl. and Vogl.On *Papaver nudicaule* L. Kogluktualuk river, July 19, 1915, J. R. Cox and J. J. O'Neill, 97852.Associated with a *Phoma* on *Oxytropis Roaldi* Ostf. Bernard harbour, August 1, 1915, 98406.The perithecia are here crowned by a group of septate, brown bristles, 90-150 x 5-6 μ . Lind comments on the variation in the size of the sporidia in this species as found in Greenland collections. The smaller sizes are near 27 x 11 μ and the largest reach 45 x 22 μ .On *Papaver* many of the sporidia were 3-septate but not mariform. In mature asci longitudinal as well as transverse septa were evident.**Pyrenophora** sp.On *Erigeron compositus* Pursh. Victoria island, March 29, 1916.

This is different from the foregoing but not in condition to determine.

Teichospora sp.On a fragment of bark of one of the willows bearing *Scleroderma fuliginosa* (Fr.). Sadlerochit river, November, 1913. This seems to be related to *T. papillosa* E. and E., and to *T. patellarioides* Sacc. Sporidia 5-septate, muriform, dark-brown. The perithecia bear short, basal, brown hyphae.

The foregoing enumeration includes thirty sphaeriaceous species inhabiting phanerogams most of which grew in the country around Bernard harbour.

Captain Fielden and H. C. Hart collected fungi on the Nares expedition. These were determined by the Rev. M. J. Berkeley who found only three sphaeriaceous species, indeed only two, for one, a *Chaetomium*, grew on a damp surface in the cabin of the *Alert* and is cosmopolitan. The other two were *Venturia Myrtilli* Cke. on *Cassiope* and *Mycosphaerella lineolata* (Desm.) on a grass.Mr. H. G. Simmons, connected with the second Norwegian expedition on the *Fram*, collected nine of the foregoing species on Ellefsmere island, viz.:*Pleospora herbarum* (Pers.). On *Arnica alpina*, *Taraxacum hyparcticum*, *Campanula uniflora*, *Armeria sibirica*, *Pedicularis capitata*, *P. lanata*, *Chamaenerium latifolium*, *Potentilla rubricaulis*, *Saxifraga aizoides*, *S. cernua*, *S. groenlandica*, *S. Hirculus*, *S. nivalis*, *Draba nivalis*, *D. fladeni-zensis*, *Papaver radicum*, *Ranunculus sulphureus*, *R. affinis*, *Melandryum affine*, *Stellaria longipes*, *Alsine verna*, *Oxyria digyna*.*Pleospora Drabae* Schroet. On *Draba alpina*.*Pleospora vulgaris* Niessl. On *Potentilla emarginata*, *Cystopteris fragilis*, and *Lycopodium Selago*.

- Clathrospora pentamera* (Karst.) Berlese. On *Luzula confusa*, *L. arcuata*, *Carex nardina*, *C. stans*, *Arctagrostis latifolia*, *Aira caespitosa* var. *arctica*, *Trisetum subspicatum*, *Poa abbreviata*, *P. glauca*, *P. cenisia*.
Clathrospora platyspora Sacc. On *Braya purpurascens*.
Pyrenophora comata (Awd. and Niessl) Sacc. On *Potentilla pulchella*, *Arenaria ciliata*, and *Oxyria digyna*.
Mycosphaerella ootheca Sacc. On *Dryas octopetala* and *D. integrifolia*.
Mycosphaerella pachyasca (Rostr.) Vgr. On *Chamaenerium latifolium*, *Ranunculus affinis*, *Eutrema Edwardsii*, *Saxifraga Hirculus*, and *Ranunculus hyperboreus*.
Mycosphaerella Tassiana (de Not.) Johans. On *Juncus biglumis*, *Eriophorum Schenckeri*, *E. polystachyum*, *Elyna Bellardii*, *Carex membranopacta*, *C. stans*, *C. ustulata*, *C. pedata*, *C. incurva*, *Arctagrostis latifolia*, *Aira caespitosa* var. *arctica*, *Alopecurus alpinus*, *Catabrosa algida*, *Trisetum subspicatum*, *Poa abbreviata*, *P. cenisia*, *P. eragans*, *Glyceria Vahlina*, and *G. distans*.

In addition, the following were also collected on Ellesmere island, viz.:

- Venturia chlorospora* Fr. On *Salix arctica*.
Sphaerulina Pleuropogonis Rostr. On *Pleuropogon Sabinei*.
Stigmataea Ranunculi Fr. On *Ranunculus sulphureus*, *R. Sabinei*.
Mycosphaerella Taraxaci (Karst.). On *Taraxacum hyparcticum*.
 " *arthopyrenioides* (Awd.). On *Papaver radicatum*.
 " *Crociferarum* (Fr.). On *Braya purpurascens* and *Droba subcapitata*.
 " *Polygonorum* (Crié). On *Polygonum viviparum*.
 " *pusilla* (Awd.). On *Aira caespitosa* var. *arctica*, *Catabrosa algida*, *Poa glauca*, *Carex membranopacta*.
 " *Luzulae* (Cke.). On *Luzula arcuata*.
 " *Wichuriana* Schroet. On *Eriophorum polystachyum*.
Sporormia intermedia Awd. On excrement of musk-oxen.
Pleospora infectoria Fekl. On *Catabrosa algida*.
Leptosphaeria microscopica (Karst.). On *Eriophorum polystachyum*.
 " *Silenes* de Not. On *Silene acaulis*.
 " *epicurecta* Cke. On *Carex stans*.
Chaetosphaeria byssiseda Rostr. On *Potentilla emarginata*.

DOTHIDEACEAE.

Dothidella sphaerelloides n. sp.

Stromatibus epiphyllis. Peritheciis vel loculis emergentibus stromatiter junctis, nigris, breviter conicis, ostiolatis. Loculis 50-180 μ . Ascis aparaphysatis, fusoides vel clavatis, 40-45 x 8-9 μ . Sporidiis plerumque 8, interdum 6 vel 4, hyalinis, distichis vel oblique monostichis, uniseptatis, 13-16 x 3 μ .

In foliis vivis *Saxifragae Hirculi* L.

Stromata epiphyllous, usually one, sometimes two or three on the same leaf. Perithecia or emergent locules stromatically connected, black, shining. 30-36 per sq. mm., shortly conical, terminating in obtuse, paler ostiola. Locules 50-180 μ in section parallel to the plane of the stroma. Asci aparaphysate or nearly so, fusoid or clavate, 40-45 x 8-9 μ . Sporidia hyaline, sub-biseriate, uniseptate, upper cell rounded at end and larger than the lower cell, the latter conic-truncate to sub-acute, 13-16 μ in length and 3 μ in width at the septum. The number of sporidia in the ascus is usually 8 but sometime 6 or even 4.

On living leaves of *Saxifraga Hirculus* L. Bernard harbor, Aug. 7, 1915 91430.

Dr. Anderson found this again on the 15th of August 1915, at Cape Barrow on the same host, 91432.

Dothidea bullulata Berk. was found on unnamed leaves by H. C. Hart on the Nares expedition. The only record for this species.

Dothidella betulina (Fr.) has been found at more than one station in both Greenland and Alaska. Both this and *Phyllachora graminis* (Pers.) are likely existent on their respective hosts here and there throughout the Canadian arctic regions.

HYSTERIACEAE.

Lophodermium arundinaceum (Schraed.) Chev.

L. culmigenum Fr.

On *Festuca rubra* L. var. *arenaria* Fr. Bernard harbour, June 10, 1916.

On *Elymus mollis* Trin. Port Epworth, Coronation gulf, July 18, 1915, J. R. Cox and J. J. O'Neill, 91350.

On *Elymus* sp. Chantry island, June 17, 1916.

Ascospores linear, mostly about $55 \times 2 \mu$.

In this family two species are named in the Alaska list (Harriman expedition) and eleven in the Greenland lists. Mr. H. G. Simmons collected two in Ellesmere land, the one named above, and *Lophodermium maculare* (Fr.) on *Myrtillus uliginosus*.

STICTIDACEAE.

Propolis angulosa Karst.?

On a fragment of bark of *Salix*, probably *Richardsonii* Hook. Sadlerochit river, Camden bay, November, 1913.

This attractive fungus is not mature enough for certain determination. It is immersed in the parenchyma of its host and has the gray-green hymenium of *P. angulosa*. The margin of whitish, triangular laciniae imparts to the apothecia a stellate appearance.

There are six Stictids in the Greenland lists but the family is unrepresented in the other American arctic lists consulted.

PEZIZACEAE.

Scleroderris fuliginosa (Fr.) Karst.

On branchlets of *Salix Richardsonii* Hook. Fifty miles up the Sadlerochit river, Camden bay, Nov. ember 13, 1913.

On *Salix* sp. On tundra southwest of Collinson point, June 7, 1914. Associated with *Mastomyces proboscidea* (Fr.) Sacc.

Apothecia, nearly black, densely gregarious and caespitose. Ascospores $60-75 \mu$ long.

This species seems to be common on willows in northern Europe. The only other American collection I have seen was made by Dr. House, on Bald mountain in New York State.

Not many of the Pezizinae are directly parasitic, at least in their ascigerous stage, but Rostrup has proved that in Denmark, where he found *Scleroderris fuliginosa* on several species of willow, it is truly parasitic and that it killed affected branches in a short time.

In Mr. Johansen's collection at Collinson point a few pycnidia of the conidial stage were observed on the same branches with the mature plants. One of the branches bore a thin crustose lichen with orange, peziza-like apothecia which R. S. Williams determined to be *Caloplaca cerina* (Ehrh.) Zahlb.

Peziza micropus Pers. var. *flavida* Phil.

Growing upon and under old sacks along the pond behind Teller, July 31, 1913.

Paraphyses gradually thickened at summit; sporidia 15-18 x 8-9 μ . Fibers of the sacking are retained in the mycelium at base of stem.

Scutellina scutellata (L.)

Peziza scutellata L. (Fr. Sys. Myc. II: 85)

Growing on rotten wood lying in water at Nome, August 20, 1916.

This seems to have had a red-orange hymenium. The margin is beset with long, rigid bristles, .5-1 mm. long; the sporidia are broad-elliptic, grumous, 19-21 μ .

No *Helvellas* or large *Pezizas* were collected. I find only one species of *Morchella* and one *Helvella* reported in the Greenland lists.

Between 40 and 50 *Pezizas* or pezizoid species are enumerated in the Greenland lists and twelve in the Alaska one (Harriman expedition). Mr. Berkeley found two in the Nares collection, *Peziza stercorea* Pers., and *Urula Hartii* Berk., and Mr. Simmons found five in Ellesmere land, viz.:

Sclerotinia Vahlana Rostr.,

Mollisia graminis (Desm.),

Trochila juncicola Rostr.,

Trochila ignobilis Karst.,

Niptera melatephra (Lach.).

UREDINACEAE.

Aecidium of (?) **Uromyces Phacae-frigidæ** (Wahl.) Har.

On living leaves of *Phaca frigida* L. Bernard harbour, July 3, 1916.

On the same host, Herschel island, August 9, 1914.

Failing to connect this aecidial stage, whose golden coloured sori cover the under surface of the leaves of its host, with the mature stage, I submitted examples of it to Professor H. S. Jackson, of Purdue University. He reports, in effect, that the aecidium is quite new to the North American flora, and that there is in northern Europe on this host a *Uromyces* described as having teleutospores only, which are evenly distributed over the leaf surface. He is of opinion that *Uromyces Phacae-frigidæ* is an *Opsis-Uromyces* and that we probably have here a hitherto undiscovered aecial stage of the fungus.

Melampsora Bigelowii Thüm.

Uredo Bigelowii (Thüm.) Arth.

On *Salix ovalifolia* Trautv. var. *camdensis* C. Schneider. Camden bay, July, 1914, 93804.

On *Salix anglorum* Thüm. Bernard harbour, July 12, 1915.

On *Salix pulchra* Thüm. Collinson point, June 13, 1914, 93809.

Uredinospores globose, rough, 18-21 μ , paraphyses with heads 23-30 μ in diameter and pedicels 15-65 x 6 μ . The walls of the spores are 2.5-3.5 μ thick.

Melampsora anglica Rostr. has been found on three species of willow in Greenland while *M. Bigelowii* is not recorded from there in the lists consulted.

Puccinia Arenariae Schum.

Teleutosporic stage on living leaves of *Merkia physodes* Fisch. Near the mouth of the Mackenzie river, 1893, Rev. Isaac O. Stringer, 14264.

One might reasonably have expected to find a considerable number of species of this very large and widely distributed family of fungal parasites on one or another of the 230 species of vascular plants, many of them in numerous specimens, collected by Mr. Johansen and other members of the expedition. The

expectation was enhanced by the fact that 23 species have been recorded on Greenland hosts and no less than 40 in the Alaska list (op. cit.). Although every plant in the Canadian Arctic collection was scrutinized for rusts in any stage, only the three named above were detected.

In 1909 Professor A. S. Hitchcock, Agrostologist to the U.S. Dept. of Agriculture, made a collecting trip through interior Alaska and part of Yukon in the neighbourhood of Dawson. He collected five Uredines in Yukon which Dr. J. C. Arthur identified as follows:—

Puccinia rubefaciens Johanss. on *Galium boreale*; *Acciduum* AP. on *Clintonia*; *Shepherdia canadensis*; *Melampsora Ribesii-Salicum* Bubak I on *Salix glauca*; *Melampsoropsis ledicola* (Peck) Arth. II on *Ledum groenlandicum*; and *Peridermium boreale* Arth. & Kern on *Picea canadensis*.

It is to be noted that Dr. Simmons did not find any Uredineae in Ellesmere land. Rev. Mr. Berkeley determined a single example brought back by the Nares expedition, collected at Proven, to be *Trichobasys Pyrolae* Berk.

USTILAGINACEAE.

Schizonella melanogramma (DC.) Schroet.

In good fruit, parasitic on the leaves of *Carex stans* Drej. Herschel island, Aug. 9, 1914, 97661.

I find no record of any other collection of this smut in the arctic regions. Dr. Simmons collected *Sphacelotheca Hydropiperis* (Schum.) de By. on *Polygonum viviparum* L. and *Contractia Caricis* (Pers.) Magn. on *Elgna Ballardii* (All.) K. Koch.

The Alaska list (op. cit.) names three species of *Ustilago* and a *Tubercinina*. The smuts like the rusts seem to be rare in the Canadian arctic regions.

BASIDIOMYCETES.

POLYPORACEAE.

Boletus scaber Fr.

On Herschel island, July 31, 1916.

The specimen had been preserved in alcohol. Soaking in water recovered some of its characters, particularly the viscidness of the pileus. The spores are very large, 16-18 x 5-6 μ , exceptionally reaching 20 μ in length with the extreme width 8 μ . This is the only collection of a *Boletus* that I find recorded west of Greenland.

It is not to be wondered at that the wood-inhabiting Thelephores, Hydnums and Polypores should be rare or absent where stunted willows and birches are the only kindred of the temperate forests.

AGARICACEAE.

Cantharellus muscigenus Fr.

Pihumalerksiak island, off Cockburn point, July 15, 1916.

Small gray-brown plants, 2 cm. high, having their mycelium apparently parasitic on the mosses.

Russula sp.

On high tundra, Herschel island, July 31, 1916.

Collector's note: "Shining, purple-rose, otherwise white."

The spores are echinulate, globose, 10 μ ; cystidia numerous, obtusely conical, 30-35 x 12 μ .

Hygrophorus cantharellus Fr.

On moss-pillow on tundra. W. of Collinson point, Camden bay, July 6, 1914.

Hygrophorus sp.

On moist ground in dried tundra swamp, Bernard harbour, August 14, 1915.
Minute plants, about a half-inch in height. "Cinnamon-brown," spores nearly globose, 10-11 μ .

Omphalia umbellifera Fr.

In tundra swamp, Herschel island, July 31, 1916.

Mr. Johansen's note on this collection states that the plant is "uniformly yellow-brown." In southern Ontario it varies from white to dingy stramineous. C. Ferdinandsen in Greenland Fungi "restres remarks upon the strong yellow colour which this species assumes in mountain altitudes and in the arctic regions. Judging from the number of records this might seem to be the most commonly occurring agaric in the American arctic region.

Galera Hypnorum Batsch.

On tundra at Cape Bathurst, July 26, 1916.

The spores are brown, elliptic-ovate, 7-10 x 5-6 μ . These plants are larger than common for *Galera Hypnorum*.

Galera tenera Schaeff.

In dried-out tundra swamp, Bernard harbour, August 16, 1915.

Collector's note: "15 mm. high, cap 6 mm., stalk 3 mm. thick at base, brown."

Lecybe flocculosa Berk.

On tundra, Bernard harbour, August 22, 1915.

Small plants about 1 cm. in width and in height. Spores smooth; cystidia crystal-capped, 60-70 μ .

Naucoria sp.

On tundra, Bernard harbour, August 22, 1915.

Hebeloma fastibile Fr.

Bernard harbour, September 1, 1915.

"To-day (July 27, 1914)", writes Mr. Johansen. "I found growing in the bare sand ashore on the sandspit (at Martin Point, Camden Bay), a big *Agaricus campestris*? shooting up from the ground, upper surface sand-covered. Total height 3½ inch., stalk 2½ inch. long and 1 inch thick at base; greatest diameter of hat-disc 3½ inches, flat; with purple-cocoa-coloured lamellae and almost ripe spores." I did not see this specimen. The species named has three arctic records—Cape Stewart, Greenland; Fram's fjord; Ellemere land and Kadiak, Alaska.

Mr. F. Johansen's notes on other unidentified agarics:

No. 1. "Hat and stalk above leather brown; ripe lamellae purple-brown; ring on stalk; east end of Herschel Island." July 31, 1916.

No. 2. Same date as No. 1, at higher elevation; "a smaller yellow-brown mushroom."

No. 3. Same place as No. 1: "*Russula* sp.? hat above shining, lighter or darker purple-rose, otherwise white; on higher tundra." Note.—The globose-echinulate spores about 9 μ , the shining pileus and other features suggest *Russula emetica* Fr.

Dated August 17, 1915, at Bernard harbour Mr. Johansen's journal contains this note: "Much rain during the latter part of this month makes quite a few (terrestrial) fungi come out."

For their certain identification many kinds of agarics require expert study of the fresh specimens with notes on such non-persistent characters as presence or lack of viscidinity, differences between the young and mature stages and tests of odour and taste. On the Amdrup Expedition to the East Coast of Greenland Agarics in six genera were collected but, according to Rostrup, the species of only one kind was determinable.

Captain Fielden and H. C. Hart of the Nares expedition collected twelve agarics which Berkeley regarded as identifiable, namely, *Omphalia umbilicata* Schaef., *O. umbellifera* (L.), *O. sphaerospora* Berk.?, *Clitopilus undatus* Fr., *Naucoria Bellotiana* Berk., *Tubaria furfuracea* Fr., *T. pellucida* (Bull.), *Stropharia Fiedleri* Berk., *Hygrophorus virgineus* Fr., *H. miniatus* Fr., *Russula integra* Fr., and *Cantharellus muscigenus* Fr.

H. G. Simmons on the 2nd Norwegian expedition collected agarics on Ellesmere land which E. Rostrup determined as follows: *Mycena pumila* (Bull.), *Collybia dryophila* (Bull.), *Tricholoma caelatum* (Fr.), *Omphalia umbellifera* (L.), *Hebeloma fastibilis* (Fr.), *Naucoria festiva* (Fr.), *N. melnoides* (Fr.), *N. nimbosa* (Fr.), *Galera hypnorum* (Batsch.), *Psalliota campestris* (L.), *Ps. Rodmani* (Peck), *Psathyrella polaris* Rostr., *Russulina lutea* (Huds.), *Cantharellus lobatus* (Pers.).

LYCOPERDACEAE.

Calvatia cretacea (Berk.) Lloyd

Lycoperdon cretaceum Berk. Journal Linn. Soc. 17: 18, 1878.

On clay slopes, Herschel island, August 9, 1914.

On tundra hill slopes, Kay point, Mackenzie river delta, August 17, 1914, J. J. O'Neill.

On stony tundra, Bernard harbour, August 10, 1915.

Of the last collection Mr. Johansen writes: "four white specimens growing two together and two others together, white, the interior a dark green mass."

In some respects this is one of the most interesting fungi collected. According to Mr. C. G. Lloyd, to whom I submitted a Kay point specimen for determination, there are only two previous collections on record, one on Bellot island by Captain Fielden of the Nares expedition in August, 1876, the type specimen, and another by Thore Fries in Lapland in 1910. Mr. Lloyd counts another found in Greenland and described by Ferdinand and Winge as *Calvatia arctica* which he thinks will prove to be the same species. The fine plate of *C. arctica* in Meddelelser om Grønland, Band 43, which Mr. Lloyd had not seen, shows that it is not the same species as *C. cretacea*.

Berkeley's description (op. cit.): "Sessile, globoso-depressum, pallide fulvum, scabro-pulveraceum, sursum cretaceum, in areolis rigidis pyramidatus fissum; capillitio fusco; mycelio repente niveo."

Mr. Lloyd had photographed the type which is at Kew, f. 929 in the above citation, thus making a valuable supplement to Berkeley's imperfect description.

The material now on hand enables me to complete the description as follows: Peridium sub-globose, 4-5 cm.; the prominent, pyramidal warts of the upper cortex gradually reduced on sides and base to a granulate or even pruinose layer; gleba purplish-brown; sterile base shallow, radiating; spores globose, echinulate, apiculate, average 6.2μ ; capillitium olive-brown, main lines about 12μ thick, branches much smaller, about 6μ thick.

This note is a revision of one published by the writer in Mycologia 9: 351, 1917.

An immature specimen collected on Herschel island, July 31, 1916, preserved in alcohol, seems to be this species.

Lycoperdon umbrinum Pers.

On Herschel island, end of July, 1916.

A single specimen 4 cm. high, turbinate head 2.5 cm. wide, and nearly cylindrical stem 1.5 cm. thick with the typically large-celled interior. Identification confirmed by Mr. C. G. Lloyd.

The Alaska list (op. cit.) gives two identified and two unidentified puff-balls. Seven members of the family are reported in the Greenland lists, *Lycoperdon gemmatum* being the commonest Greenland species.

W. S. Bruce in his very interesting little book on Polar Exploration speaks of the commonness of "deadman's snuff," the spores of the puff-ball species. Puff-balls may be common in the Old World arctic regions but the species do not seem to be numerous in the American arctic country.

FUNGI IMPERFECTI.

LEPTOSTROMACEAE.

Leptothyrium pulchrum n. sp.

Pycnidii epiphyllis, orbiculatis vel late ellipticis, nigris, depressis, diverse apertis, interdum fissis, 200-450 μ . Conidiis hyalinis, 3-8 x 1-1.5 μ . Basidiis 15-28 x 1-1.5 μ .

In foliis mortuis *Salicis pulchrae* Cham.

Pycnidia epiphyllous, circular to wide-elliptic, black, shining, centrally depressed, opening variously, in some cases cleft or gaping, 200-450 μ . Conidia hyaline, 3-8 x 1-1.5 μ on long sporophores 15-28 x 1-1.5 μ .

On dead leaves of *Salix pulchra* Cham. Collinson point, June 11, 1914.

The general colour of the dead leaves is chocolate-brown. The pycnidia are scattered on much larger spots that are translucent when held to the light.

Leptostroma herbarum (Fr.) Sacc.

On *Polemonium caeruleum* L. var. *villosum* (Rud.) Brand. Konganevik, July 5, 1914, 98965.

Long narrow pycnidia; Spores 4-7 x 1.5-2 μ .

Leptostromella Drabae n. sp.

Pycnidii sub-orbicularibus, discoideis concavisve, vel elliptico-oblongis, hysteroideis, brunneis. 65-160 μ . longis. Conidiis sessilibus vel sub-sessilibus, hyalinis, crescentibus, extremis partibus acutis, continuis, 15-18 x 2-2.5 μ .

In caulibus *Drabae corymbosae* R. Br.

Pycnidia suborbicular, discoid or concave to elliptic-oblong, hysterooid, thickly scattered on stem, brownish, sub-superficial, 65-160 μ long. Stylospores on short basidia or sessile, hyaline, crescentic, gradually narrowing, acute at each end, continuous, 15-18 x 2-2.5 μ . The yellowing of the affected stems seems to be due to the fungus.

The type on stems of *Draba corymbosa* R. Br. Bernard harbour, August 7, 1915, 98661.

On *Draba alpina* L. Bernard harbour, July 10, 1915, 98618.

Discosia acuta n. sp.

Pycnidii nigris, planis vel centraliter depressis, ostiolatis, 120-170 μ . Conidiis hyalinis, 2-septatis, curvis, angustis, acutis, 18-24 x 1-1.5 μ . Aristic 5-9 μ longis.

In caulibus *Ranunculi nivalis* L.

Pycnidia shining black, plane to centrally depressed, distinctly ostiolate, 120-170 μ . Conidia hyaline, 2-septate, curved, narrow, acute, aristate at one end, on basidia less than half their length, 18-24 x 1-1.5 μ ; bristles 5-9 μ long.

On stems of *Ranunculus nivalis* L. Collinson point, June 14, 1914, 97916.

SPHAERIOIDACEAE.

Phoma herbarum West.

On stems of *Erysimum inconspicuum* (S. Wats.) McMillan. Big falls, Tree river, July 8, 1915, J. R. Cox and J. J. O'Neill, 98466.

Stylospores various in size, some of them irregular, 2-7 μ .

Phoma Cerastii-maximi n. sp.

Pycnidiis atris, cellis polygonis, muris crassis. Conidiis subglobosis, irregularibus, hyalinis, 5-7 μ .

In foliis *Cerastii maximi* L.

Pycnidia black, individual cells dark-brown, polygonal, 7-9 μ , thick-walled. Conidia subglobose, irregular, hyaline, 5-7 μ .

This is distinct from *Phoma nebulosa* (Fr.) Mont. var. *Cerastii* Pass. which has bacillar spores.

On leaves of *Cerastium maximum* L. Cape Krusenstern, March, 1916, J. R. Cox, 101931.

Phoma sp.

On *Pedicularis* sp. Taylor island, August 22, 1918, Capt. J. F. Bernard. Spores nucleate at each end, 9 x 3 μ .

Dendrophoma Lupini-arctici n. sp.

Pycnidiis atris, subcuticularibus, papillatis, 270-360 μ ; ostiolis perforatis, erumpentibus, 36 μ . Basidiis valde ramosis. Conidiis hyalinis, oblongis, angustis, nucleatis, 6-9 x 2.5-3 μ .

In caulibus *Lupini arctici* Watson.

Pycnidia large, black, sub-cuticular, papillate; the large perforate ostiola —36 μ — erumpent. Conidia borne on many-branched sporophores, hyaline, fuliginous in the mass, narrowly oblong, minutely nucleate at each of the rounded ends, 6-9 x 2.5-3 μ .

On stems of *Lupinus arct. is* Watson. Mouth of the Mackenzie river, 1893, Rev. Isaac O. Stringer, 14627.

Diplodina minor n. sp.

Pycnidiis nigricantibus ad basin saepe sed non semper hyphis perpaucis cinctis. Conidiis hyalinis, oblongis, extremis partibus nucleatis, uniseptatis, 5-8 x 2-2.5 μ , plerumque 7 x 2.5 μ .

In caulibus plantae ignotae.

Pycnidia dark-coloured, scantily surrounded at the base, but not in every example, by brown, radiating hyphae. Conidia hyaline, oblong, nucleate at each end, uniseptate, 5-8 x 2-2.5 μ , mostly 7-2.5 μ .

On stems of an unknown plant. Chantry island, June 17, 1916.

A very similar species was found on stems and leaves of *Papaver nudicaule* L. at Clifton point near the mouth of the Croker river by the Rev. H. Girling, July 1, 1916, 100472. The fructification was slightly larger, the longest conidia reaching 11 or 12 μ .

Mastomyces proboscidea (Fr.) Sacc.

On branches of *Salix* sp. Southwest of Collinson point, June 7, 1914. These interesting pycnidia are related to *Scleroderris fuliginosa* (Fr.) Karst.

Diplodia Calamagrostidis n. sp.

Pycnidiiis nigris, inclusis, ostiolis erumpentibus, 270 μ . Conidiis fuligineis, uniseptatis; basidiis 15-24 μ longis, plerumque 20 x 5-6.5 μ .

In foliis *Calamagrostidis purpurascens* R. Br.

Pycnidia black, covered except the perforate ostiola, average size 270 μ . Conidia fuliginous, uniseptate, on relatively short basidia, varying in length from 15 to 24 μ , but mostly 20 x 5-6.5 μ .

On leaves of *Calamagrostis purpurascens* R. Br. Bernard harbour, August 14, 1915, 91330.

Septoria Ammodeniae n. sp.

Pycnidiiis plerumque hypophyllis, valde numerosis, nigris, globosis, 80-90 μ . Sporulis rectis, hyalinis, 15-20 x 1-1.5 μ .

In foliis vivis *Halianthi peploidis* (L.) Fr.

The leaves of the host plant are discoloured by the fungus. Pycnidia very numerous, black, small, 80-90 μ , globose, mostly hypophyllous. Sporules straight or nearly so, 15-20 x 1-1.5 μ .

On languishing or dead leaves of *Halianthus peploides* (L.) Fr. West of Martin point, July 30, 1914, 98330.

This fungus was sought in both *Septoria* and *Rhabdospora*. The leaves do not seem to be truly maculate. If the tissues of the host were known to be dead when they were attacked by the fungus, an investigator would look for it in the latter form-genus.

Rhabdospora Drabae (Fuckl.) Berl. and Vogl.

On stems of *Anemone parviflora* Michx. Bernard harbour, July 4, 1915, 97828.

Sporules 18-23 x 1.5 μ in the middle, curved, acutely pointed.

Lind in his Micromycetes of Northeast Greenland devotes a page or more to the discussion of the probable synonymy of this rather common species. He names a dozen host-genera which it inhabits in Greenland; all of them are dicotyledons.

No Leptostromata or Sphaeropsides are reported in the Nares collections. The 2nd Norw. Arc. Fram Exp. collections in Ellesmere land contained:

Phoma Cichoriacearum Sacc. on *Taraxacum hyparcticum*.

" *alpina* Speg. on *Saxifraga groenlandica*.

" *Caricis* (Fr.) on *Carex membranopacta*.

Coniothyrium Saxifragae Rostr. on *Saxifraga tricuspidata*.

Diplodia Simmonsii Rostr. on *Luzula arcuata*.

Stagonospora Caricis (Oud.) on *Carex nardina* and *C. misandra*.

" *Eriophori* Rostr. on *Eriophorum polystachyum*.

" *Alopecuri* Rostr. on *Alopecurus alpinus*.

Septoria cercosperma Rostr. on *Ranunculus affinis*.

" *semilunaris* Joh. on *Eutrema Edwardsii*.

" *minuta* Karst. on *Luzula arcuata*.

" *nebulosa* Rostr. on *Poa glauca*.

" *punctoidea* Karst. on *Elyna Bellardii* and *Kobresia caricina*.

DEMATIACEAE.

Hormiscium stilbosporum (Cda.) Sacc.

On *Salix pulchra* Cham. Camden bay, September 27, 1913, 93765.
On same host, Collinson point, June 13, 1914, 93809.

Cladosporium herbarum (P.) Link?

On *Salix* leaves. Sadlerochit river, November 13, 1913.

Rhytisma?

On young twigs of *Salix rotundifolia* Trautv.

A black rhytismoid fungus not in fruit. Konganevik June 30, 1914.

Rhytisma salicinum (P.) is reported on the foliage of several species of willow in Greenland.

Needles of *Picea canadensis* (Mill.) BSP., collected at Sandstone rapids on the lower Coppermine, February, 1915, by Mr. F. Johansen, and at Escape rapids on the same river by Dr. J. M. Anderson in February, 1916, furnish an unsolved problem. Mucedo-like tufts, concolorous with the dead leaves, were found on nearly every leaf of the twigs collected but spores were not found in situ. Failure of the functions of the twig may have caused the death of the leaves and dissections of the latter strengthened this supposition. I submitted affected material to Mr. J. R. Weir, Forest Pathologist at Washington, D.C., who replied that he had not before seen spruce leaves in this condition. He is disposed to agree with me that the fungus is saprophytic. A distorted twig taken at the first named collection suggested to Mr. Johansen the effects produced by some species of *Peridermium*. In it I found the sloughs of Chermes-like insects but nothing else.

LIST OF NEW SPECIES AND VARIETIES

Mycosphaerella immersa n. sp.

" *minor* (Karst.) var. *reticulata* n. sp.

Didymosphaeria Johansenii n. sp.

Pleospora Drabae Schroet. var. *nuda* n. var.

Dothidella sphaerelloides n. sp.

Leptothyrium pulchrum n. sp.

Leptostromella Drabae n. sp.

Discosia acuta n. sp.

Phoma Cerastii-maximi n. sp.

Dendrophoma Lupini-arctici n. sp.

Diplodina minor n. sp.

Diplodia Calamagrostidis n. sp.

Septoria Ammodeniæ n. sp.

INDEX OF HOST PLANTS

- Alopecurus alpinus*
- Clathrospora pentamera*
- Anemone parviflora*
- Rhabdospora Drabae*
- Mycosphaerella confinis*
- Arnica alpina*
- Pleospora herbarum*
- Artemisia hyperborea*
- Mycosphaerella pachyasca*
- Artemisia Richardsoniana*
- Pleospora vulgaris*
- Astragalus alpinus*
- Mycosphaerella pachyasca*
- Calamagrostis purpurascens*
- Diplodia Calamagrostidis*
- Campanula uniflora*
- Pyrenophora chrysospora*
- Carex stans*
- Schizonella melanogramma*
- Cassiope tetragona*
- Mycosphaerella immersa*
- Mycosphaerella inconspicua*
- Cerastium maximum*
- Phoma Cerastii-maximi*
- Dodecatheon frigidum*
- Mycosphaerella minor*
- Pyrenophora comata*
- Draba alpina*
- Leptostromella Drabae*
- Draba corymbosa*
- Leptostromella Drabae*
- Draba nivalis*
- Mycosphaerella pachyasca*
- Pleospora Drabae*
- Dryas integrifolia*
- Massarina Dryadis*
- Dupontia Fischeri*
- Leptosphaeria Hierochloae*
- Elymus mollis*
- Lophodermium arundinaceum*
- Pleospora herbarum*
- Empetrum nigrum*
- Metasphaeria sp.*
- Physalospora Crepiniana*
- Epilobium latifolium*
- Pleospora arctica*
- Erigeron compositus*
- Mycosphaerella eriophila*
- Pleospora vulgaris*
- Pyrenophora sp.*

INDEX OF HOST PLANTS—Continued

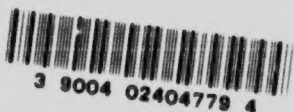
- Erysimum inconspicuum*
 Phoma herbarum
Festuca rubra var. *arenaria*
 Lophodermium arundinaceum
Halianthus peploides
 Septoria Ammodeniæ
Hesperis Pallasii
 Pleospora herbarum
Juncus arcticus
 Clathrospora Elynae
Lesquerella arctica
 Pleospora herbarum
Lupinus arcticus
 Dendrophoma Lupini-arctici
Lychnis apetala
 Pleospora vulgaris
Merckia physodes
 Puccinia Arenariæ
Mertensia arctica
 Didymosphaeria Johansenii
Musci
 Cantharellus muscigenus
Oxyria digyna
 Mycosphaerella pachyasca
 Pyrenophora comata
Oxytropis campestris var. *sordida*
 Pyrenophora chrysospora
 Pleospora arctica
Oxytropis nigrescens
 Pyrenophora chrysospora
Oxytropis Roaldi
 Pleospora herbarum
 Pyrenophora paucitricha
Papaver nudicaule
 Diplodina minor
 Mycosphaerella pachyasca
 Pleospora vulgaris
 " *herbarum*
 " *sp.*
 Pyrenophora paucitricha
Parrya arctica
 Mycosphaerella pachyasca
 " *sp.*
 Pleospora herbarum
Parrya macrocarpa
 Pyrenophora chrysospora
Pedicularis sudetica
 Mycosphaerella Pedicularis
Pedicularis sp.
 Phoma sp.
Phaca frigida
 Uromyces Phacae-frigidæ?
 Pleospora vulgaris
Picea canadensis
 Mucedo

INDEX OF HOST PLANTS—Concluded

- Polemonium caeruleum*
 Leptostroma herbarum
Potentilla palustris
 Mycosphaerella pachyasca
Potentilla pulchella
 Pleospora herbarum
Ranunculus affinis
 Mycosphaerella ootheca
 Pleospora vulgaris
 Rhabdospora sp.
Ranunculus nivalis
 Discosia acuta
Salix anglorum
 Melampsora Bigelowii
Salix ovalifolia var. *camdensis*
 Melampsora Bigelowii
Salix pulchra
 Hormiscium stilbosporum
 Leptosphaeria borealis
 Leptothyrium pulchrum
 Melampsora Bigelowii
Salix reticulata
 Mycosphaerella minor var. *reticulata*
 (*Venturia subcutanea*)
Salix Richardsonii
 Gnomonia sp.
 Propolis angulosa
 Scleroderris fuliginosa
Salix rotundifolia
 Rhytisma sp.
Salix sp.
 Cladosporium herbarum?
 Leptosphaeria borealis
 Mastomyces proboscidea
 Scleroderris fuliginosa
 Teichospora sp.
Saussurea angustifolia
 Pleospora vulgaris
Saxifraga Hirculus
 Dothidella sphaerelloides
Saxifraga Nelsoniana
 Mycosphaerella minor f.
Statice Armeria f. *sibirica*
 Clathrospora platyspora
Trisetum spicatum
 Mycosphaerella Tassiana.

13 C2t v.4 pt.C c.3

of the Canadian Arctic
 1913-18.

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